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Mammals of the Platte River Valley: Final Report

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Mammals of the Platte River Valley

Final Report

February 1993

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Project funded 1991 by the U.S. Fish and
Wildlife Service – Grand Island, Nebraska

Attention: Mr. David Bowman
Mr. John Sidle

Mammals of the Platte River Valley

P.W. Freeman and R.A. Benedict

Summary

Nebraska is characterised as a critical juncture for distributional ranges of mammals from northern, southern, eastern, and plains faunal elements. As might be expected, ranges have not remained static since the benchmark survey done by Jones, 1964. We have evidence that 10 of about 80 species of mammals found in the Platte River Valley have expanded their ranges. Opossum, red bats, bog lemmings, white-footed mice, woodchucks and least weasels are further west in the state, and grasshopper mice are further east in the state. Elliot's short-tailed shrew, cotton rats and armadillos are further north in the state. We have the northernmost specimens of armadillos ever recorded in the United States. These new records may be attributed to better sampling, but there is also good evidence that vegetation has increased along the rivers in the state. Especially on the move are those mammals associated with woodlands. These can be expected to expand into the riverine forests where they develop within the dispersal range of an existing population.

Crossing the state in the east-west transect called the Platte River Valley would not impress most people as a particularly interesting journey. But for those of us who are students of the state's flora and fauna, we can attest that Nebraska is a crossroads for plants and animals whose distributional centers are beyond the boundaries of the state to the north, south, east and west. The convergence of organisms in Nebraska goes unnoticed for the most part because not only is the elevational change gradual from east to west, but since most of our travel is limited to the riverine forest, habitats abutting the valley go unnoticed. Because of the south-central position of Nebraska in North America we are actually at the intersection of distinctly different habitats from which the respective organisms meet and compete for space.

On the eastern side of the state along the Missouri River is the oak-hickory forest more typical of states in the eastern United States. The elevation at this end of the state is 800–900'. The Platte Valley, with its riverine forest of cottonwood and willow, passes through a region dominated by tall grass prairie to about Grand Island. Between Grand Island and Paxton is mixed prairie, and from Paxton to the Wyoming border is short grass prairie. In several areas, the valley passes through sandhills prairie including pockets to the north of the river starting just west of Columbus, and the large continuous body of sandhills starting just west of Gothenberg and extending to Scottsbluff. South of the river is a pocket of sand sage prairie from North Platte to Ogallala, and Rocky Mountain forest south of the North Platte River from Bridgeport west to the border. These forests are in the wildcat hills and Bighorn mountains. A surprising elevation of 5400 feet at the western border is evidence of a long, slow climb from east to west. The river valley where it exits the state is somewhat less at 4025 feet.

The mammals of Nebraska were comprehensively surveyed in the late 1940s to early 1960s by J. Knox Jones, Jr., in a volume titled "Distribution and taxonomy of mammals of Nebraska," published in 1964. In a long-term effort by the senior author to determine what changes have occurred in the distributions of mammals in the state in the intervening years, we conducted both a field survey and a survey of museum records to investigate the distribution of mammals in the Platte River Valley in Nebraska during the summer of 1991.

Our survey revealed that the ranges of nine mammals have extended either north to the Platte River or west along its valley. A tenth species has a range extension to the east. Range expansions are more easily detected than range contractions. Because of the small scale and duration of this project, we concentrated on range expansions. In this report we are assuming that the distributions of the terrestrial native species not mentioned here are much the same as they were in Jones's study and, indeed, we have evidence that this is true for most of the remaining species. The distributions of bats are probably much the same as the study done by Czaplewski *et al* (1979). Any additional distributional work done on bats, like evidence for range contractions, will take substantially more time and effort.

Distribution patterns of mammals in the plains states have been examined recently (Armstrong *et al* 1986), and the nine species with expanded ranges in this study represent faunal elements to the north, south, and east, or those that are widespread or local in nature. A faunal element is a group of species from "a common geographical origin, or common routes of movement, or common ecology" (Armstrong *et al* 1986: 3). Species within a faunal element have similar continental distributions.

Widespread Faunal Element

Peromyscus leucopus, the white-footed mouse, is a widespread species in the United States, particularly to the east, north, and south (Hall 1981). The subspecies P. l. aridulus is found in western Nebraska, and this survey reveals it has expanded west in the Platte Valley to Keith County, just below Lake McConaughy on the North Platte, and at Roscoe along the South Platte (fig. 1). This mouse is typically found in woodlands rather than grasslands and has also been found further west along the Republican River (Freeman, unpublished data; Roedel, 1992). Although this is not a great extension compared with that in the Jones survey, it does support the observation that woodland has increased along the rivers in Nebraska (Roedel 1992). Peromyscus leucopus is a mouse to keep track of because it is a known carrier of Lyme disease, which is now known to occur in the state (albeit from the southeasternmost county). The impact on the forest community when P. leucopus invades may be considerable. The two mice it replaces, P. maniculatus and Reithrodontomys megalotis, are typically in fairly low densities in the forests whereas P. leucopus can reach great density. Given the importance of mice as seed consumers and prey, this replacement may represent a significant change.

New records extending the range in or near the Platte Valley: **Keith County:** where N. Platte exits Lake Ogallala (7 specimens, RAB); 1/2 mile S and 1/2 mile E of Roscoe (21 specimens, RAB). **Lincoln County:** North River Wildlife Mgmt. Area, 2.9 miles N of Hershey (19 specimens, RAB).

Local Faunal Element

Although there are no species endemic to the Plains there are a few species restricted locally that cannot be assigned to any particular faunal element. One of these local species is Blarina hylophaga, Elliot's short-tailed shrew (fig. 2). This shrew is generally more southerly in the state and its larger congener, Blarina brevicauda, more northerly. These two meet along a line that stretches from east to west across the state and appears to be a fiercely contested boundary. The interesting thing, however, is that the position of the line has fluctuated, and specimens of B. hylophaga have been taken in Kearney, Howard and Nance counties, which are well north of the distribution in Jones, 1964 (at that time B. hylophaga was thought to be a subspecies of B. brevicauda). The particular problem of what is happening between B. hylophaga and B. brevicauda is currently under study by the junior author.

New records extending the range in or near the Platte Valley: **Kearney County:** 2.5 miles S of Kearney (1 specimen, UNK); 26 1/2 miles S Kearney (several specimens without skulls, UNK). **Howard County:** 2 miles N, 2 1/2 miles W Elba (2 specimens, UNK). **Nance County:** 300 yards N Belgrade (3 specimens, UNK).

Eastern Faunal Element

The red bat, Lasiurus borealis, has now been taken from eastern Wyoming (Clark and Stromberg, 1974; fig. 3). Jones, 1964, did not find this bat in the panhandle of the state, but we now have evidence that it is, indeed, statewide. Czaplewski *et al* (1979) report a specimen from Sioux County, and we also now have a record from Bridgeport. It is not surprising that the red bat is found statewide, and because bats are difficult to sample, it may well have always been statewide.

New records extending the range in or near the Platte Valley: **Morrill County:** Bridgeport (7 specimens, BHS).

A second mammal with most of its distribution in the eastern United States is Synaotomys cooperi, the bog lemming (fig. 4). We now have records of this animal further west in Lincoln County along the Platte, and as far west as Red Willow County along the Republican River. Jones, 1964, found an isolated population of Synaotomys cooperi at the Rock Creek Fish Hatchery in Dundy Co., which he named as a subspecies distinct from that in the east. Given the more western extension of this mouse, we wonder whether the subspecific designation is actually justified or does the western edge of this mouse naturally fluctuate during dry and wet periods. Neither Freeman (unpublished data) nor Roedel (1992) were able to find this mouse in recent years in Dundy County.

New records extending the range in or near the Platte Valley: **Lincoln County:** 4 1/2 miles S, 1 1/2 miles W Brady.

Southern Faunal Element

The opossum, Didelphis virginianus, and the cotton-rat, Sigmodon hispidus, are from a more southern continental distribution. The former has now been found along the North Platte in Morrill and Scotts Bluff counties and extends into Wyoming (Clark and Stromburg, 1974; fig. 5). Hall (1981) leaves only the northwesternmost corner of the state as outside of the range of the opossum.

New records extending the range in or near the Platte Valley: **Morrill County:** T20N, R50W, Sec. 16 NE (1 specimen, BHS); near river bridge S of Broad Water (1 specimen, BHS).

Records from the University of Nebraska at Kearney reveal that Sigmodon hispidus, the cotton rat, has been taken in Kearney County, just south of the Platte River (fig. 6). The cotton rat was formerly taken just north of the Nebraska-Kansas border in the central and eastern portions. This specimen most likely represents the northernmost record for this species in the United States.

New records extending the range in or near the Platte Valley: **Kearney County:** 3 miles S Kearney (1 specimen, UNK).

Another southern mammal that has been moving farther and farther north into North America since the Pliocene is the armadillo, Dasypus novemcinctus (fig. 7). We now have three records of armadillo in the state. One is from Dundy County, a second specimen from just south of York in York County, and a third from just west of Ord in Valley County. To our knowledge these specimens are the northernmost records of armadillo in the United States, but we have no evidence that this species is actually breeding this far north. Mild winters probably allow these animals to move further north than usual. Armadillos and their relatives do not adapt well to cold weather.

New records extending the range in or near the Platte Valley: **York County:** 3.5 miles S York (1 specimen, UNK).

Northern Faunal Element

Woodchucks, Marmota monax, have a northern distribution that extends across

Canada and into the U.S. to the east of Nebraska as far south as southern Alabama. We have several records extending the range of this species west in Nebraska and one as far west as Ravenna in Buffalo Co., which is not quite halfway across the state (fig. 8). We also have records in three other counties -- Greeley, Antelope, and Madison -- which are all to the west of the previous range reported by Jones (1964).

New records extending the range in or near the Platte Valley: **Buffalo County:** 1/2 mile W of Ravenna (1 specimen, UNSM).

Least weasels, Mustela nivalis, are also from the north and, like woodchucks, extend across Canada. However, they do not penetrate nearly as far south into the U.S. to the east of Nebraska. Our survey shows that the westernmost specimens of this small carnivore have been taken from Bridgeport in Morrill County (fig. 9). This is a considerable range extension compared to the distribution in Jones, 1964. Like bats, least weasels are difficult to sample. They may always have been as far west as Bridgeport, but now we have verified proof of a more westerly distribution along the Platte.

New records extending the range in or near the Platte Valley: **Morrill County:** Bridgeport (1 specimen, BHS); Northport, 1/4 mile W weigh station (1 specimen, BHS).

Campestrian or Prairie Faunal Element

Although grasshopper mice, Onychomys leucogaster, are listed as part of the campestrian element by Armstrong *et al* (1986), these animals are abundant in the southwestern United States and extend as far west as Arizona, California, Oregon and Washington. We now have specimens verifying an eastern extension of this species, from just south of the Platte in Cass Co., and from DeSoto National Wildlife Refuge in Iowa (Ken Geluso, unpubl. data; fig. 10). We also have a record from Malvern in Mills Co., Iowa. The animals are rare in traplines in the eastern part of the state and whether they can be found in all the easternmost counties of the state has not yet been verified. This is not a large eastern expansion of the range but it is an interesting one.

New records extending the range in or near the Platte Valley: *Cass County:* T10N, R13E, Sec. 13, SW 1/4 (1 specimen, RAB); T11N, R11E, Sec. 27, SW 1/4 of SW 1/4 (1 specimen, RAB); T10N, R14E, Sec. 18, SW 1/4 (4 specimens, RAB); T10N, R11E, Sec. 15, SE 1/4 of SE 1/4 (1 specimen, RAB); T10N, R13E, Sec. 5, NE 1/4 of SE 1/4 (2 specimens, RAB).

Other Species

Of the remaining species of mammals that could be found in the Platte River Valley, we have new records that verify the presence of most of them in much the same range as in Jones, 1964, or Czaplewski *et al.*, 1979. There are a few species for which we have no data. In the east we cannot verify the existence of the eastern chipmunk, southern flying squirrel, or the pine vole in the Platte Valley. There has been one record of white-tailed jackrabbit from Morrill County in recent years but none to the east. The same is true for the swift fox -a recent record from Perkins County but none to the east. The opposite is true for the gray fox – a recent specimen from Saunders County but none from the west. And finally, no new records of the Wyoming ground squirrel have been taken. These are not unexpected findings.

Acknowledgements

We thank the curators or care takers of several collections who have allowed us to examine material under their care or sent us data from their collection. These are: Dr. R. M. Timm and Dr. N. Slade, University of Kansas Museum of Natural History; Dr. J. Choate, Museum of the High Plains, Hays, KS; Mr. Herb Karcher, Bridgeport High School (BHS); Dr. J. Springer, University of Nebraska–Kearney (UNK). We are also grateful to Mr. Thomas Labedz, Collections Manager, Division of Zoology, University of Nebraska State Museum (UNSM), assembled and organized much of the data from Kearney State College (now UNK) and to Dr. H. H. Genoways, Director of the Museum, who paid his salary.

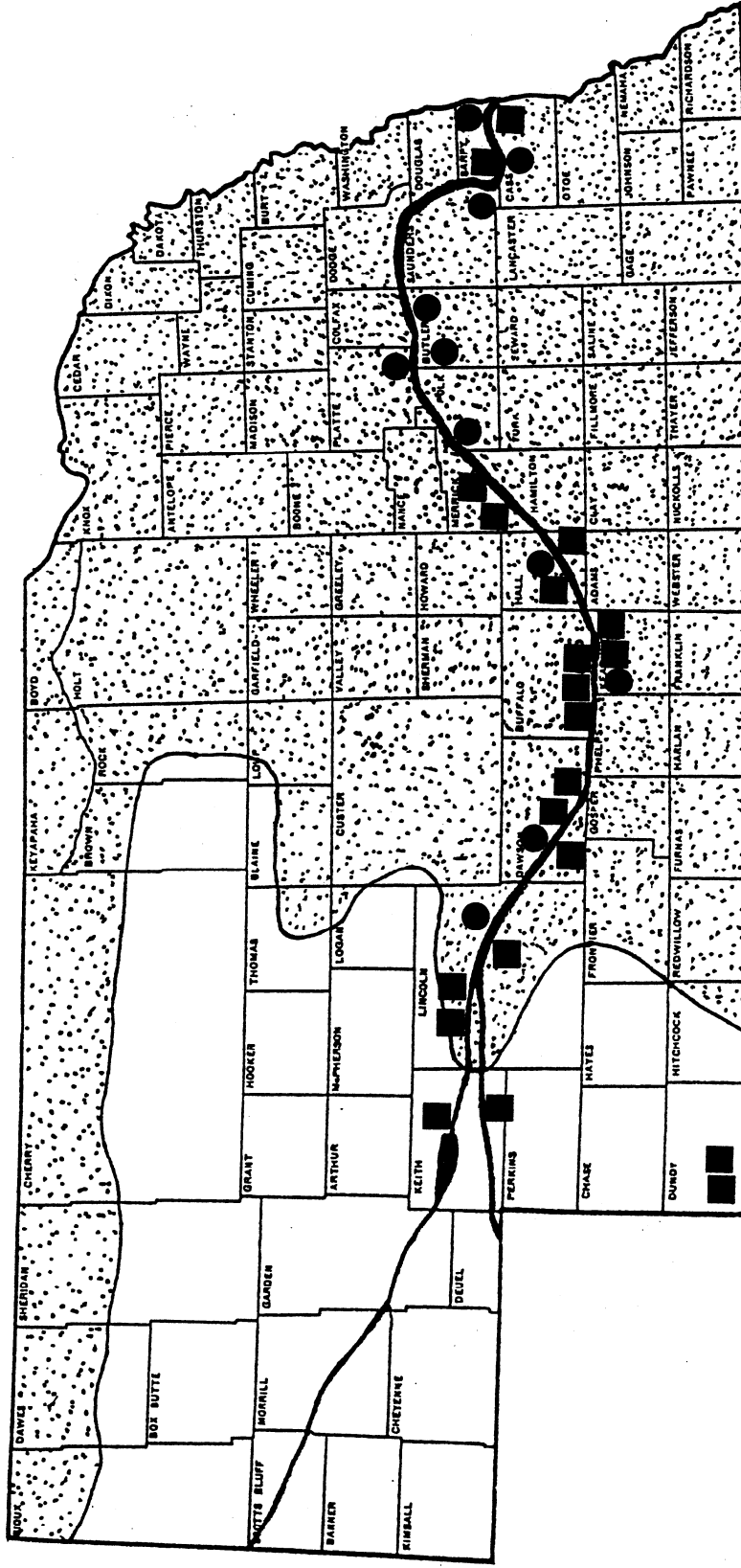
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Platte River Valley Mammal Survey

University of Nebraska State Museum - Summer 1991

White-footed Mouse (*Peromyscus leucopus*)



Stippling = Distribution of species according to Jones, 1964

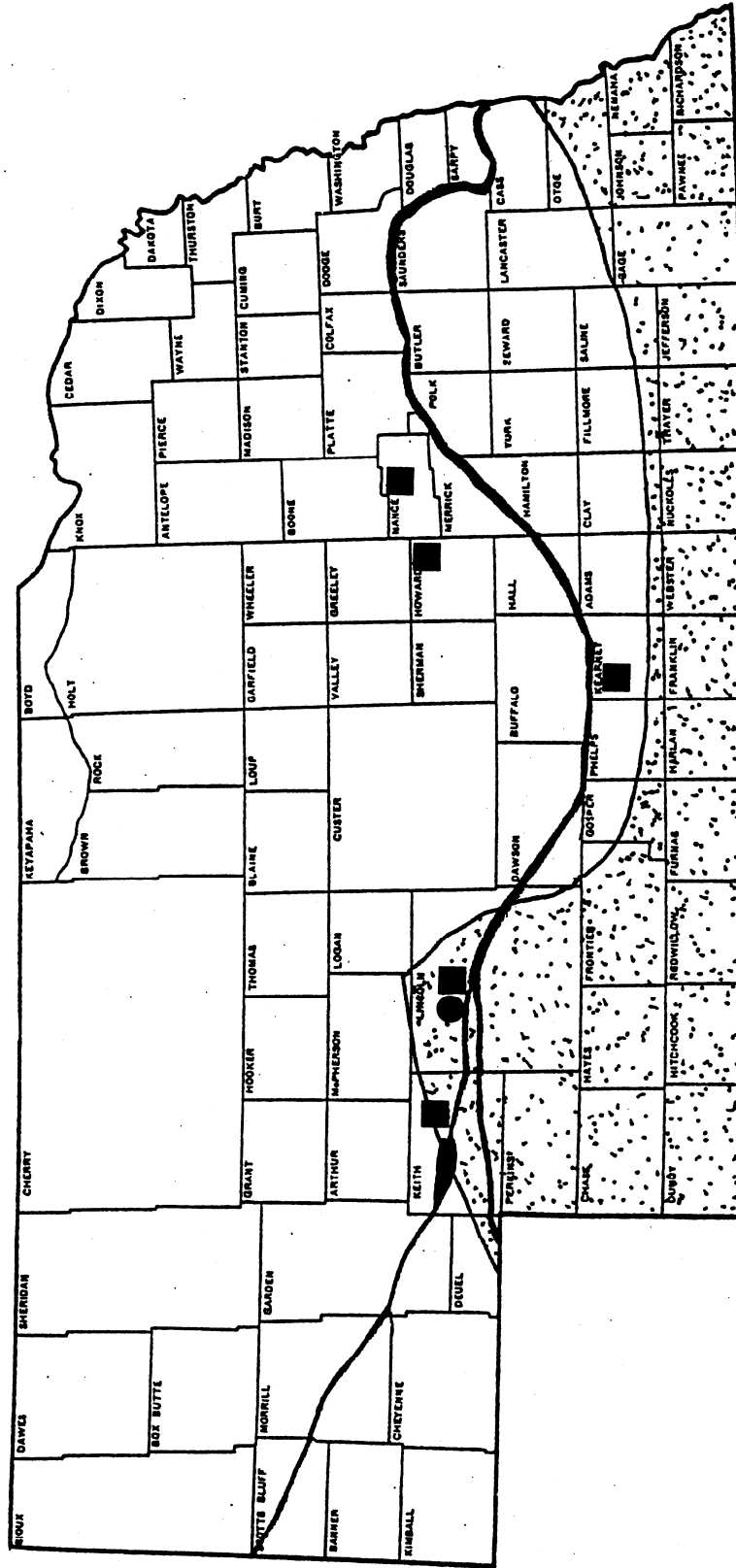
● = records from Jones, 1964

■ = new records

Platte River Valley Mammal Survey

University of Nebraska State Museum - Summer 1991

Elliot's Short-tailed Shrew (*Blarina hylophaga*)



Stippling = Distribution of species according to Jones, 1964

● = records from Jones, 1964

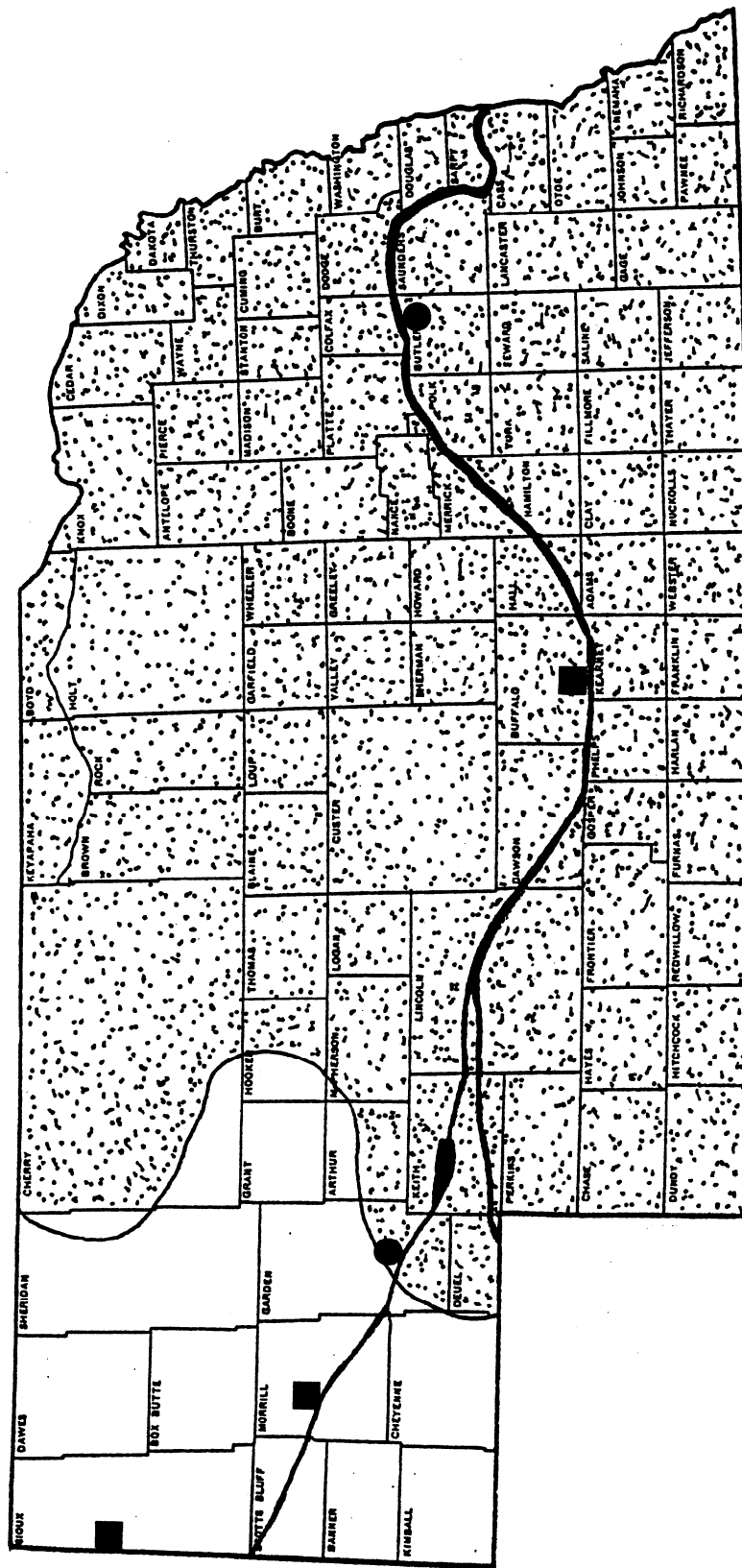
■ = new records

Figure 2

Platte River Valley Mammal Survey

University of Nebraska State Museum - Summer 1991

Red Bat (*Lasiurus borealis*)



Stippling = Distribution of species according to Jones, 1964

● = records from Jones, 1964

■ = new records

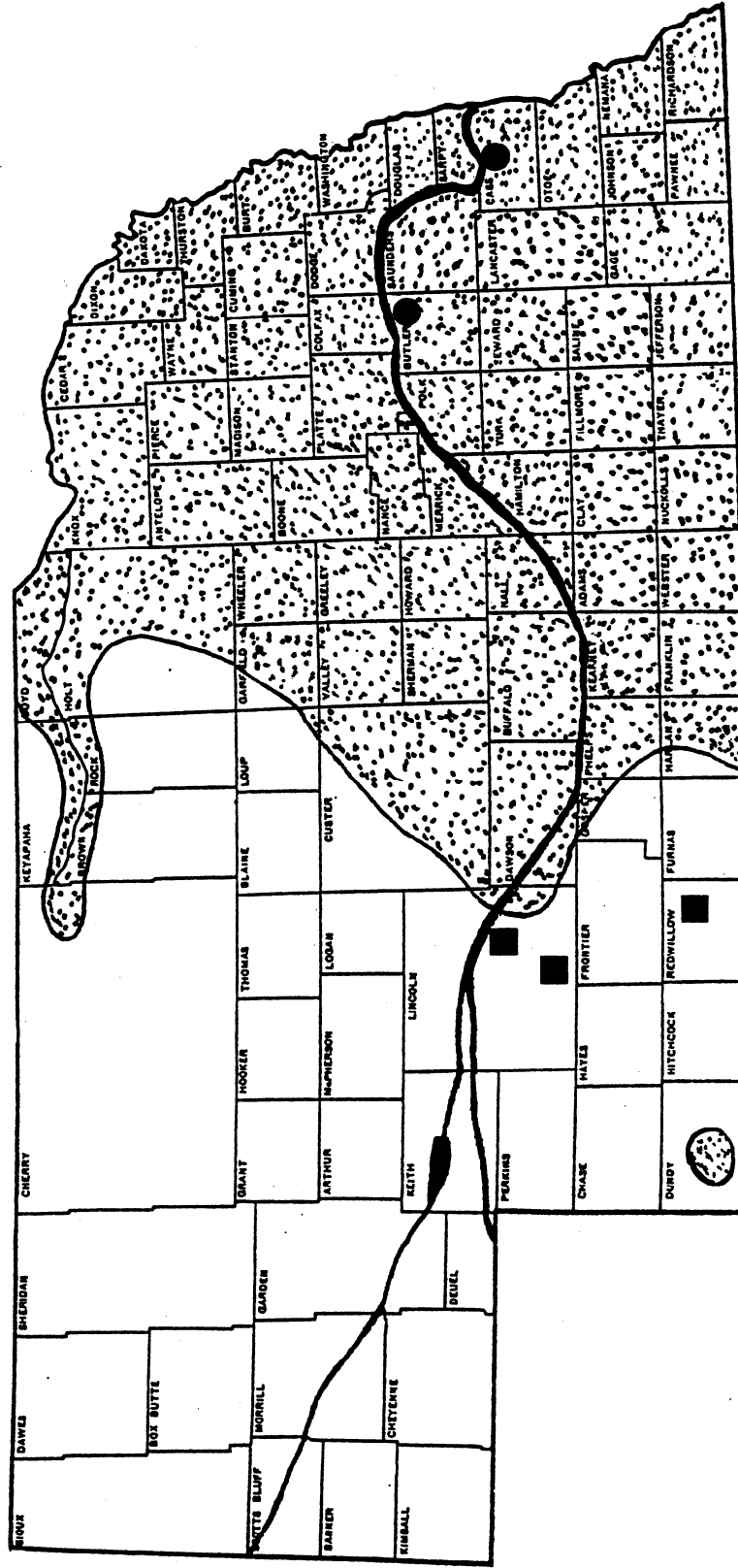
Freeman and Benedict, 1993

Figure 3

Platte River Valley Mammal Survey

University of Nebraska State Museum - Summer 1991

Southern Bog Lemming (*Synaptomys cooperi*)



Stippling = Distribution of species according to Jones, 1964

● = records from Jones, 1964

■ = new records

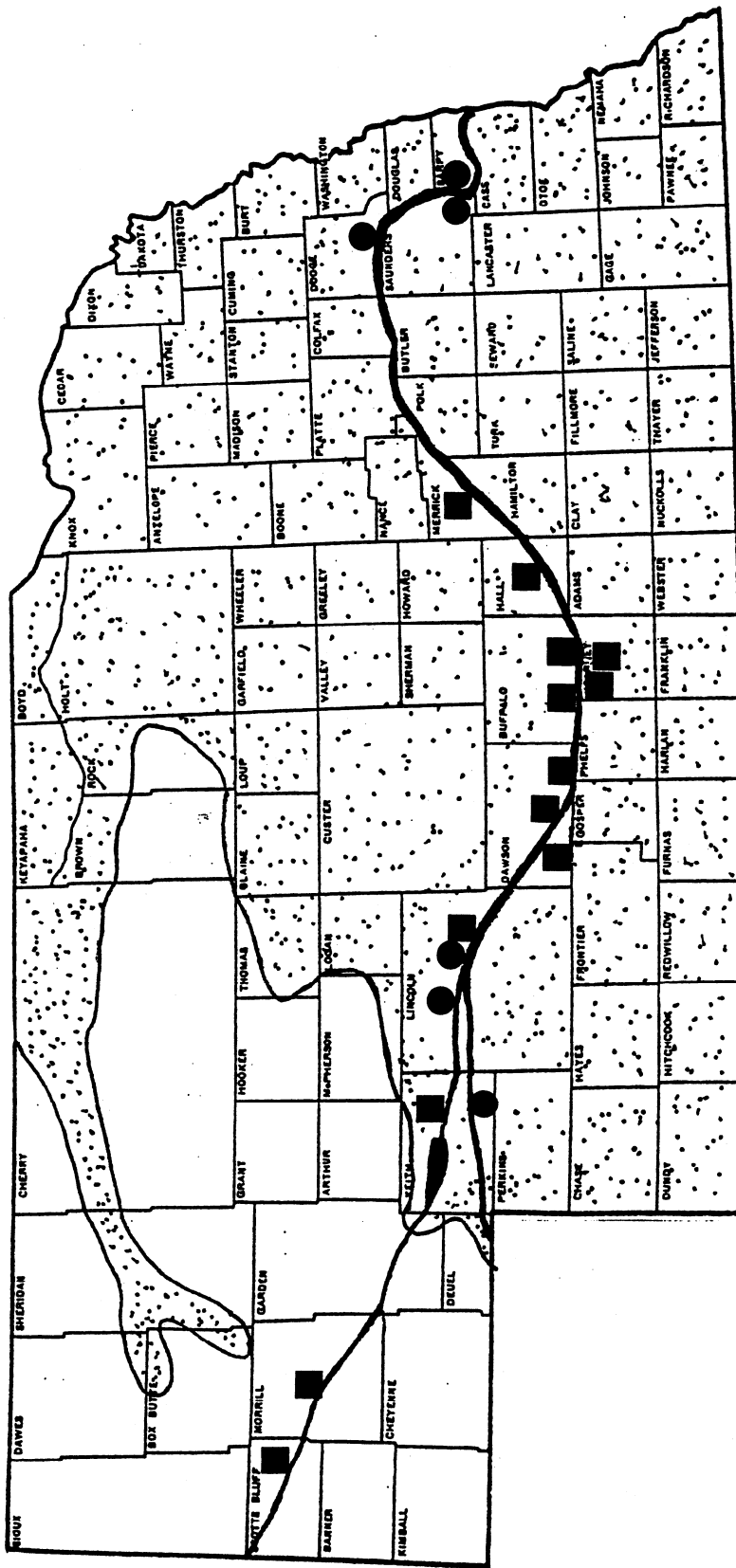
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Figure 4

Platte River Valley Mammal Survey

University of Nebraska State Museum - Summer 1991

Opossum
(*Didelphis virginiana*)



Stippling = Distribution of species according to Jones, 1964

● = records from Jones, 1964

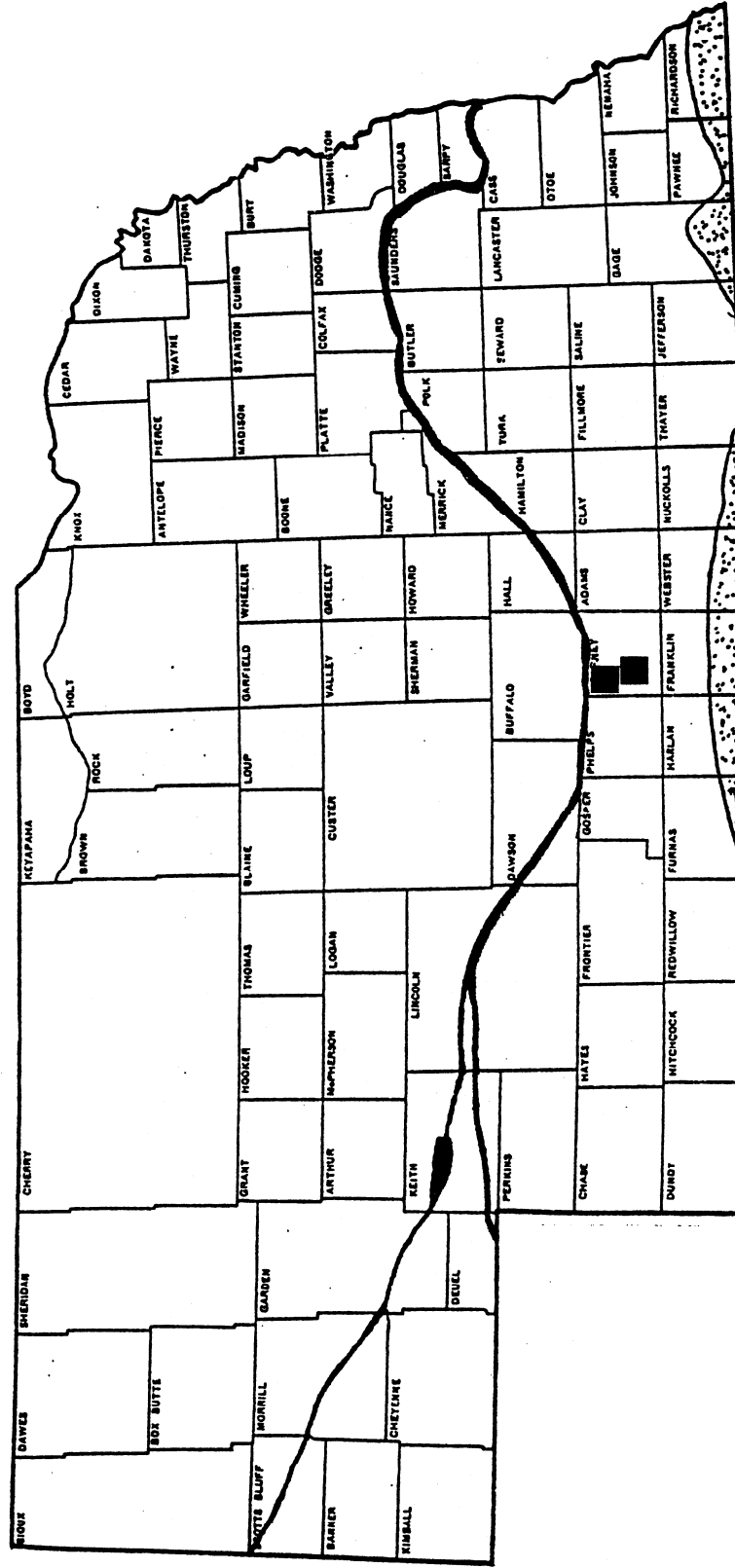
■ = new records

Figure 5

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Cotton Rat (*Sigmodon hispidus*)



Stippling = Distribution of species according to Jones, 1964

● = records from Jones, 1964

■ = new records

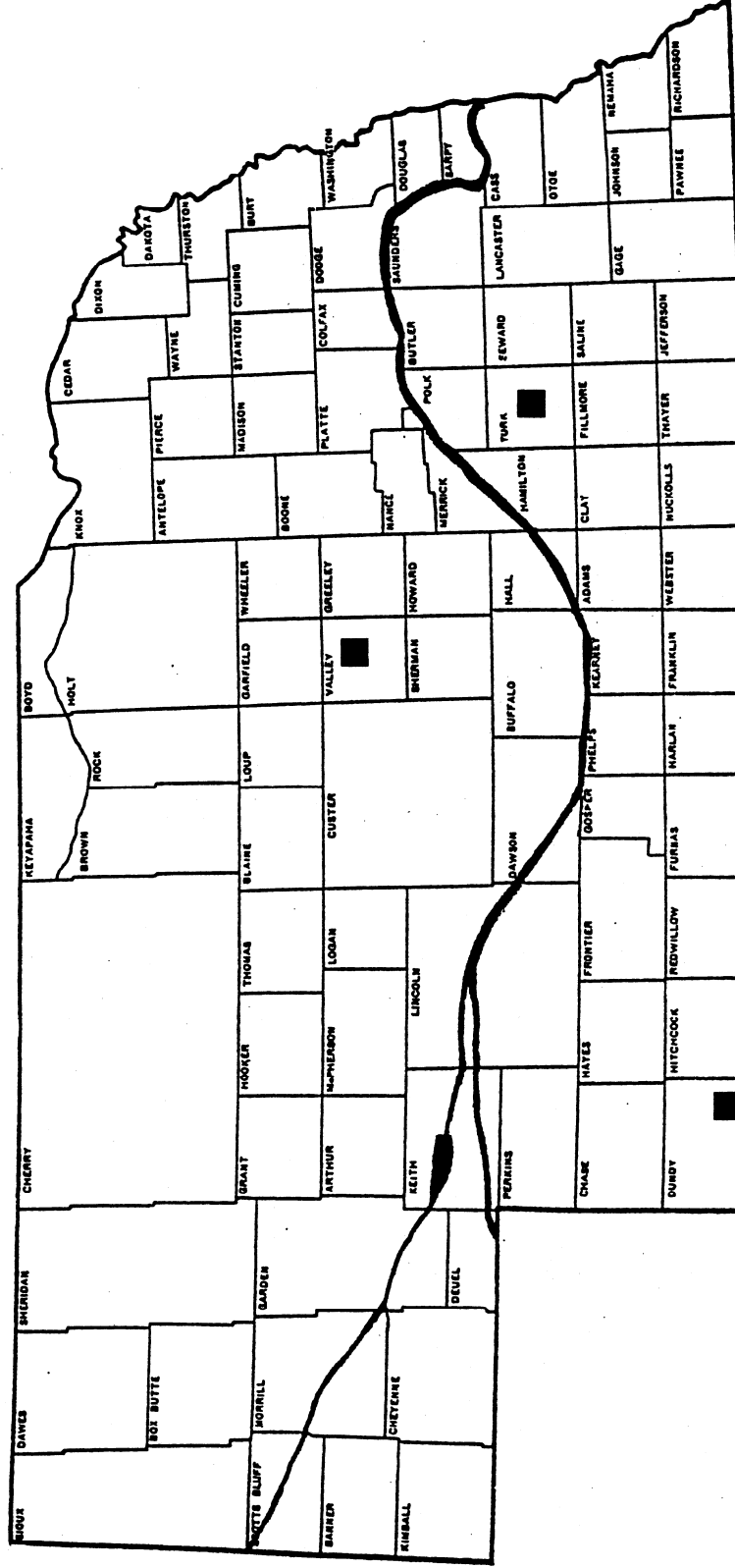
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Figure 6

Platte River Valley Mammal Survey

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Nine-banded armadillo (*Dasypus novemcinctus*)



Stippling = Distribution of species according to Jones, 1964

● = records from Jones, 1964

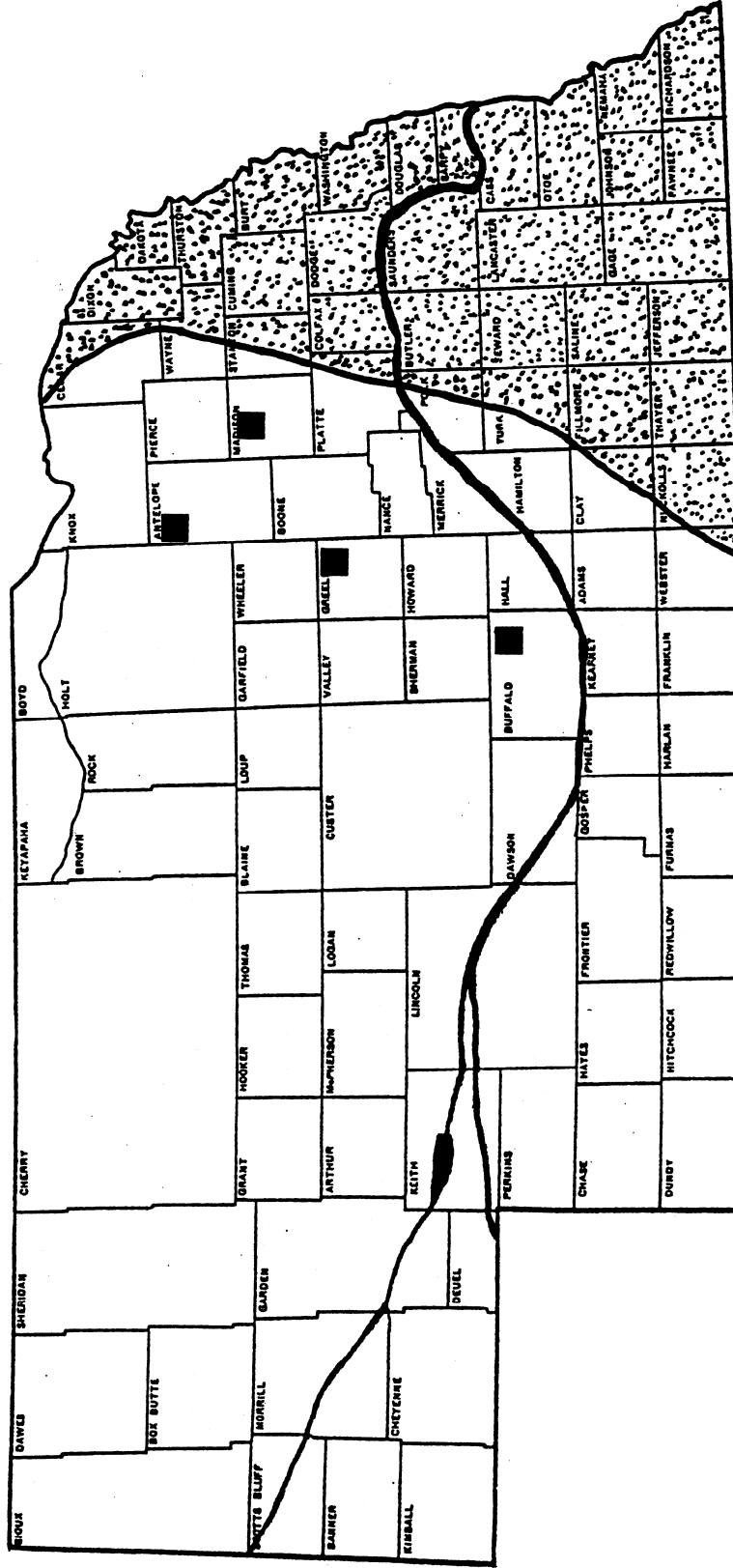
■ = new records

Figure 7

Platte River Valley Mammal Survey

University of Nebraska State Museum - Summer 1991

Woodchuck (*Marmota monax*)



Stippling = Distribution of species according to Jones, 1964

● = records from Jones, 1964

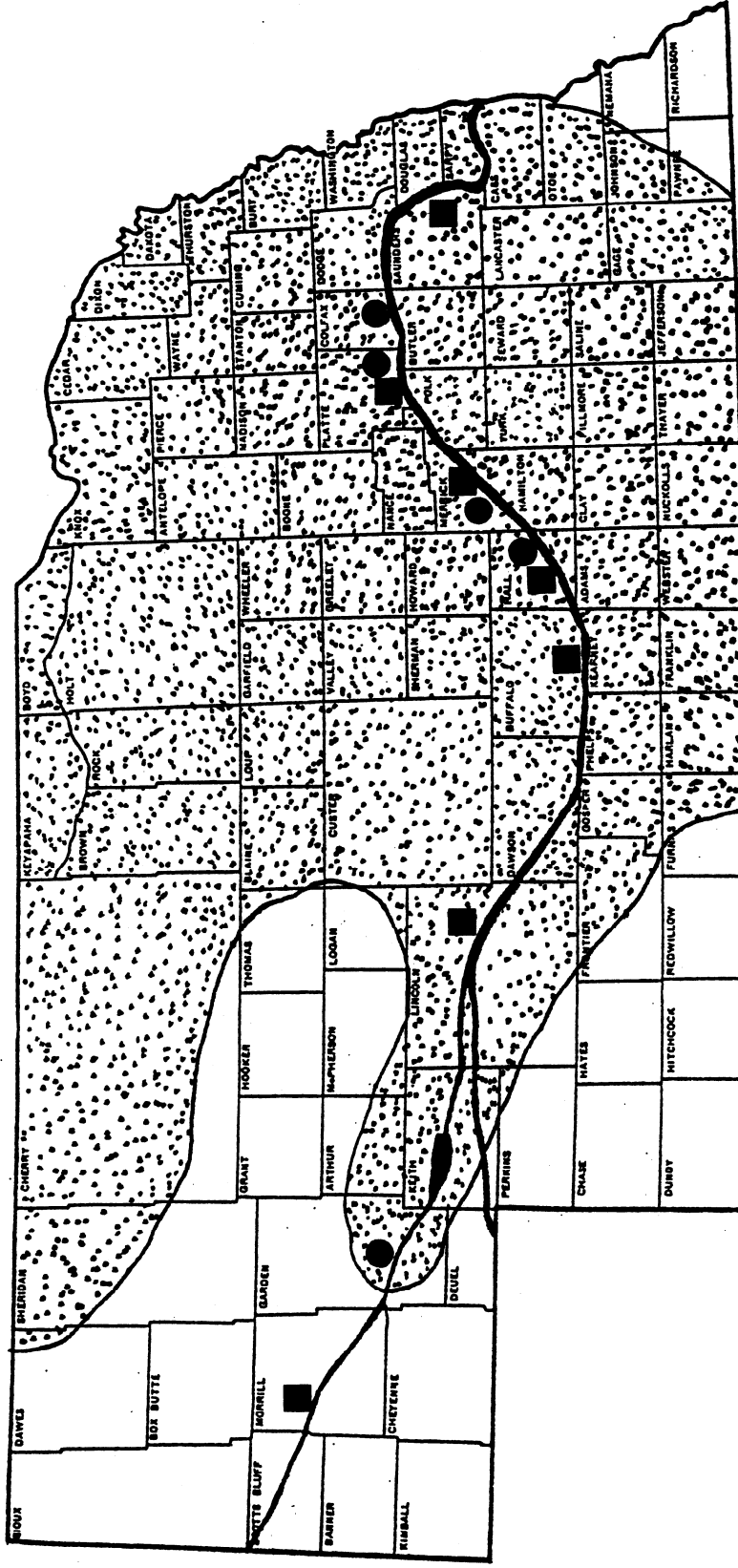
■ = new records

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Figure 8

Platte River Valley Mammal Survey

University of Nebraska State Museum - Summer 1991

Least Weasel (*Mustela nivalis*)

Stippling = Distribution of species according to Jones, 1964

● = records from Jones, 1964

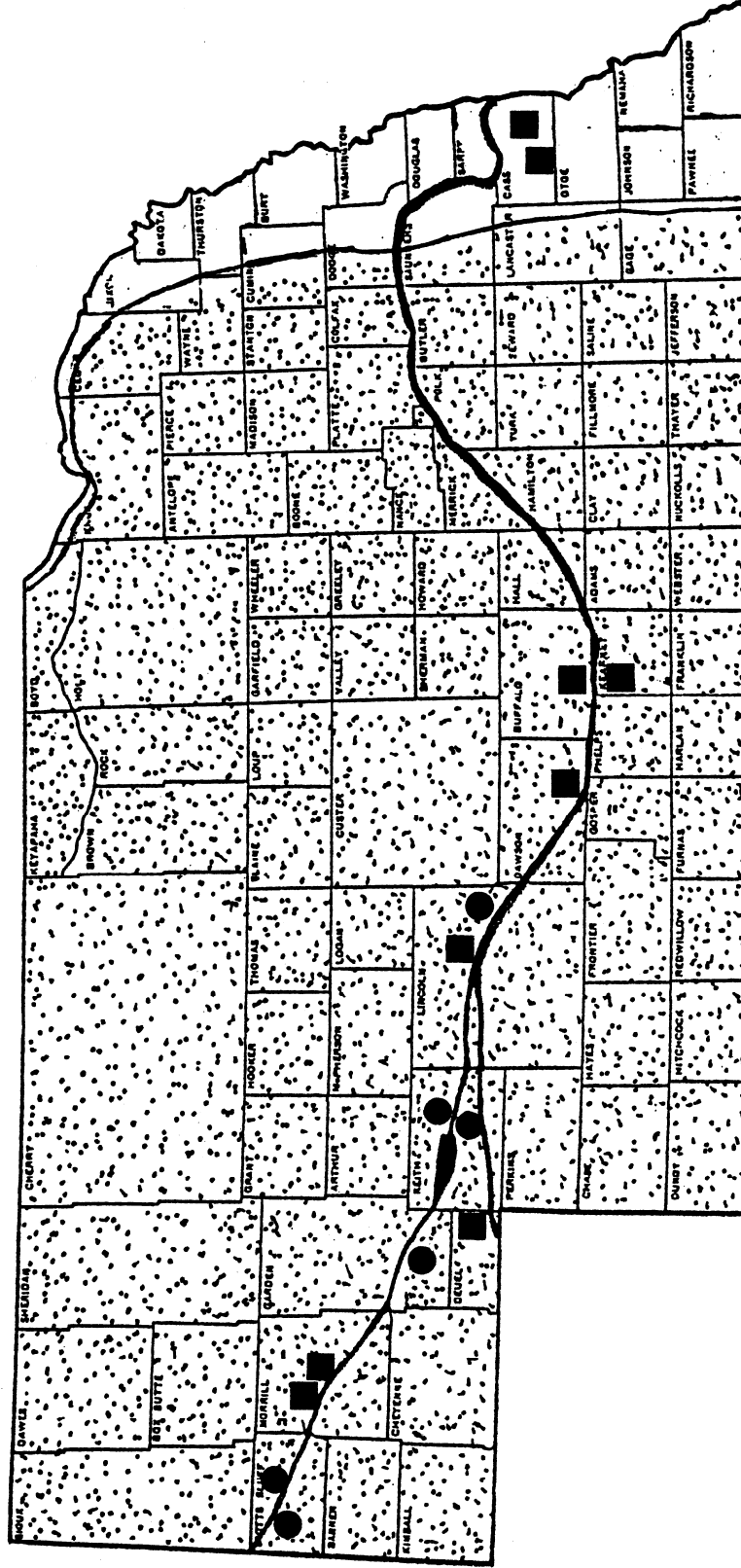
■ = new records

Figure 9

Platte River Valley Mammal Survey

University of Nebraska State Museum - Summer 1991

Northern Grasshopper Mouse (*Onychomys leucogaster*)



Stippling = Distribution of species according to Jones, 1964

● = records from Jones, 1964

■ = new records

Freeman and Benedict, 1993

Figure 10